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A Randomized Trial Of Attention Training For Generalized Social Phobia: Does Attention Training Change Social Behavior?

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A RANDOMIZED TRIAL OF ATTENTION TRAINING FOR GENERALIZED SOCIAL PHOBIA: DOES ATTENTION TRAINING CHANGE SOCIAL BEHAVIOR?

by

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ABSTRACT

The use of attention training protocols for the treatment of generalized social anxiety disorder (SAD) is undergoing increased examination. Initial investigations were positive but more recent investigations have been less supportive of the treatment paradigm. One significant limitation of current investigations may be over-reliance on self-report. In this investigation, we expanded on initial investigations by using a multimodal assessment of patient functioning (i.e., including behavioral assessment). Patients with a primary diagnosis of SAD (n = 31) were randomly assigned to eight sessions of attention training (n = 15) or placebo/control (n = 16). Participants were assessed at pre- and post-treatment via self- and clinician-report of social anxiety as well as anxious and behavioral response to two *in vivo* social interactions. Results revealed no differences between groups at post-treatment for all study outcome variables, suggesting a lack of effect for the attention training condition. The results are concordant with recent investigations finding a lack of support for the use of attention training as an efficacious treatment for patients with SAD.

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LIST OF ACRONYMS

AC	Attention Control
ADIS	Anxiety Disorders Interview Schedule
ANCOVA	Analysis of covariance
ANOVA	Analysis of variance
APA	American Psychiatric Association
AT	Attention Training
BARS	Behavioral Avoidance Rating Scale
BDI-II	Beck Depression Inventory–II
BSPS	Brief Social Phobia Scale
CGI	Clinical Global Impressions
DSM-IV-TR	Diagnostic and Statistical Manual of Mental Disorders (4^{th} ed.) Text Revision
IST	Impromptu Speech Task
LSAS-SR	Liebowitz Social Anxiety Scale-Self Report
SAD	Social Anxiety Disorder
SPAI	Social Phobia and Anxiety Inventory
UCT	Unstructured Conversation Task

INTRODUCTION

Individuals presenting with social anxiety disorder (SAD; also termed social phobia) experience an intense fear and apprehension of social situations during which they might be evaluated by others (DSM-IV-TR; American Psychiatric Association [APA], 2000). In addition to the distress associated with these social situations, SAD is frequently marked by avoidance of the anxiety-provoking situation (e.g., avoiding conversations and/or giving presentations in a class or at work). The physiological and psychological distress, anticipatory response, and behavioral avoidance associated with SAD create significant functional impairment. Two subtypes have been identified for people with SAD. These include the nongeneralized or specific (social fears are limited to few, specific social situations) and the generalized (social fears are present in most social situations) subtypes (APA, 2000).

SAD is a common disorder, with prevalence rates ranging from 1-15% of the general population (APA, 2000; Costello, Eggar, & Angold, 2004; Costello, Eggar, & Angold, 2005; Heimberg, Stein, Hiripi, & Kessler, 2000) and the typical age of onset is early to mid-adolescence (age 11 to 15; DeWit, Ogborne, Offord & MacDonald, 1999; Silverman et al., 1999; Weiss & Last, 2001). Earlier onset SAD is associated with more negative outcomes including co-morbid anxiety disorders, depression, substance use, and conduct problems later in life (Beidel & Turner, 1998; Grant et al., 2005; Kessler, 2003; Lecrubier, 1998).

Of particular importance, relative to impairment, is that an early history of SAD may also result in dysfunctional social skills (Beidel, Rao, Scharfstein, Wong, & Alfano, 2010; Turner, Beidel, Dancu, & Stanley, 1989). As children and adolescents with SAD progressively avoid social situations, they miss opportunities to develop the social skills necessary for effective social interaction. The pattern of inadequate skill and social distress associated with SAD, in turn, may

result in additional negative effects (e.g., co-morbid anxiety disorders, depression, substance abuse, and behavioral problems), and create significantly more dysfunction (e.g., dropping out of school, turning down job offers, interpersonal relationship problems) with age (Clark, 1993; Costello et al., 2003; Lecrubier, 1998; Rao et al., 2007; Stein, Torgrud, & Walker, 2000).

In addition to its behavioral elements, cognitive aspects of SAD have received increased attention. According to cognitive theories, anxious individuals direct their attention *toward* threatening stimuli pertinent to their specific concerns (e.g., Beck, Emery, & Greenberg, 1985; Eysenck, 1997; Mogg & Bradley, 1998; Rapee & Heimberg, 1997; Williams, Watts, MacLeod, & Mathews, 1997). This attentional bias is theorized to be influential in the etiological and maintenance aspects of anxiety disorders, particularly SAD, and has therefore translated into research examining attentional biases toward symptom-specific stimuli associated with SAD.

There has been increasing interest in the role of attentional bias theory in SAD (e.g., Asmundson & Stein, 1994; Becker, Rinck, Margraf, & Roth, 2001; Bradley, Mogg, & Millar, 1999). Yet some research suggests that socially anxious individuals ultimately *avoid*, rather than selectively attend to, external socially threatening stimuli (Chen, Ehlers, Clark & Mansell, 2002; Clark & Wells, 1995; Gamble & Rapee, 2010; Garner, Mogg, & Bradley, 2006; Mansell, Clark, Ehlers, & Chen, 1999). Furthermore, other studies suggest there is little or no relationship and results have varied depending on contextual factors (Bradley et al., 1997; Mansell, Ehlers, Clark, & Chen, 2002; Pineles & Mineka, 2005).

Support for the existence of attentional biases in socially anxious participants has been found using a variety of measurement methods. Examples of these include heightened activation of the anterior cingulate cortex while viewing socially evaluative faces (Amir et al., 2005), elevated duration of eye-gaze toward faces with emotional valence as measured by infrared eye

tracking systems (Bradley, Mogg, & Millar, 1999), and biased responding toward socially threatening/related words during modified Stroop (1935) Color-Naming Tasks (Becker, Rinck, Margraf, & Roth, 2001; Holle, Neely, & Heimberg, 1997; Hope, Rapee, Heimberg, & Dombeck, 1990; Maidenberg, Chen, Craske, Bohn, & Bystritsky, 1996; Mattia, Heimberg, & Hope, 1993; McNeil et al., 1995; Spector, Pecknold, & Libman, 2003). Computerized dot-probe paradigms (MacLeod, Mathews, & Tata, 1986) have also been used to measure attentional biases in this population. Briefly, this paradigm includes the short presentation (typically 500ms) of two stimuli (e.g., neutral/threatening words or pictures). Upon the disappearance of the stimuli, a dot (also referred to as a probe) appears in the place of one of the stimuli. Conceptually, a participant is biased toward attending to a particular stimulus type (e.g., a picture of a socially-threatening face) if he or she recognizes the presence of the dot with increased speed and accuracy when it takes the place of that particular stimulus type. Based on the use of this paradigm, attentional biases in socially anxious samples have been observed toward socially-threatening words (Amir, Elias, Klumpp, & Przeworski, 2003; Asmundson & Stein, 1994; Ononaiye, Turpin, & Reidy, 2007) and later pictures of socially-threatening faces (Mogg & Bradley, 2002; Mogg, Philippot, & Bradley, 2004; Pishyar, Harris, & Menzies, 2004; Sposari & Rapee, 2007), as single words are unlikely to be the source of threat while participants with SAD engage in social situations (Bradley et al., 1997).

Researchers also have examined the manipulability of attentional biases. For example, some investigations have observed decreases in the severity of attentional biases following cognitive behavioral therapy (Calamaras, Tone, & Anderson, 2012; Mattia et al., 1993; Pishyar, Harris, & Menzies, 2008; Price, Tone, & Anderson, 2011). The potential malleability of attentional biases prompted the designing of specific attention training paradigms for participants

with social anxiety. Studies examining the utility of attention training (also attention bias modification) treatments in people with SAD are emerging. Two initial randomized control trials (RCTs) used an identical eight-session attention training protocol (i.e., Amir et al., 2009 and Schmidt, Richey, Buckner, & Timpano, 2009), and both concluded that treatment gains were observed in the treatment condition above and beyond that of a placebo control. However, in one trial, significant between-group differences were not observed at post-treatment for clinician- and self-report measures (Schmidt et al., 2009).

Infrequently discussed, but nonetheless important caveats also exist regarding the extent of clinically significant change observed in these investigations. Specifically, although statistical differences in self- and clinician-reported social anxiety were observed between the treatment conditions, at post-treatment average scores on these measures still fell far above the scores delineating the clinical range for SAD, as recommended by prior literature. For example, average post-treatment scores on the Social Phobia and Anxiety Inventory (SPAI; Turner, Beidel, & Dancu, 1996) were 99.1 (Amir et al., 2009) and 92.47 (Schmidt et al., 2009), exceeding established cut-off scores of 60 for probable SAD. Despite self-reported social anxiety, large percentages of treated participants no longer met diagnostic criteria for SAD (50% and 72% for Amir et al. (2009) and Schmidt et al. (2009), respectively). Moreover, neither investigation attempted to examine changes in participants' social behavior during social interactions, previously identified as a common deficit in patients with SAD and a considerable feature of the disorder (Beidel et al., 2010; Turner et al., 1989). Since the time of the initial publication, subsequent RCTs have failed to replicate the initial positive outcome (Boettcher, Berger, & Renneberg, 2011; Carlbring et al., 2012; Heeren, Reese, McNally, & Philippot, 2012; Neubauer et al., 2012) whether delivered in person or over the internet.

To date, no study has replicated carefully the methodology of the initial investigations (Amir et al., 2009; Schmidt et al., 2009) while conducting a multimodal assessment of patient functioning (e.g., including behavioral assessment of patient functioning in addition to reports of social anxiety). Expanding the assessment strategy will allow examination of changes in social behavior and provide further elucidation of the clinically significant utility of this treatment. The specific hypotheses are as follows: 1) at post-treatment the percent of participants meeting diagnostic criteria for SAD in the treatment condition will be significantly lower than the percent meeting criteria in the placebo condition, 2) at post-treatment the mean SPAI score for the treatment condition will be significantly lower than that of the control condition, and 3) at post-treatment participants in the treatment condition will show significant improvement in social behavior during in-vivo social interactions, as reflected by increases in duration of eye-contact and time speaking as well as decreases in self-reported anxiety, relative to the control condition.

METHOD

Procedure

Following informed consent, participants were assessed via a clinician administered diagnostic interview, self- and clinician-report measures, and a behavioral assessment of social skills at our Anxiety Disorders Clinic in the Southeastern United States. As in previous investigations, participants were informed that they would be randomly assigned to one of two groups: one group would receive the anxiety treatment and the other group would participate in the non-treatment condition. Participants were informed that the purpose of the study would be to evaluate the usefulness of new computer-based treatments for anxiety. They were then randomly assigned to either the Attention Training (AT; $n = 15$) or Attention Control (AC; $n = 16$) condition using a Microsoft Excel random number generator formula. Participants completed a total of eight, bi-weekly treatment sessions during which they were instructed to attempt to identify the letter probe (*E* or *F*) as rapidly as possible without sacrificing accuracy. Following the completion of eight sessions, participants completed the post-treatment assessment, which was identical to the pre-treatment assessment. All assessments and treatment sessions were administered by senior doctoral students in clinical psychology (the first and third authors). Both the clinicians and participants were blinded to treatment condition until the conclusion of the study.

Participants

Participants were recruited via community advertisements targeting “shy adults”. Participants completed a telephone screen, followed by an in-person diagnostic interview, self- and clinician-report measures, and a behavioral assessment. Participants who met DSM-IV-TR criteria for a primary diagnosis of generalized SAD were invited to participate in the study.

Exclusionary criteria (from Amir et al., 2009 and Schmidt et al., 2009) included (a) evidence of severe depression or suicidal intent, (b) evidence of current substance abuse or dependence, (c) evidence of current or past schizophrenia, bipolar disorder, or organic mental disorder, (d) any concurrent psychotherapy, (e) change in pharmacological treatments during the 12 weeks prior to study entry, and (f) cognitive–behavioral therapy within the previous 6 months.

A total of 31 adults participated in the study. Participants in the AT condition ranged from 18 to 45 years of age (M = 24.20, SD = 7.99) and those in the AC condition ranged from 18 to 44 years of age (M = 24.44, SD = 6.96). The two groups did not differ significantly in age, $F(1,29) = .008$, $p = .930$, $\eta_p^2 = .000$. There were slightly more males (62.5%) than females (37.5%) in the AC condition, whereas the opposite was true in the AT condition (46.7% and 53.3%, respectively) but the difference was not statistically significant, $\chi^2(1, 31) = .784$, $p = .376$, $\Phi = .159$. Similarly, there were no group differences in race/ethnicity, $\chi^2(4, 31) = 2.372$, $p = .668$, $\Phi = .277$. The AT condition was comprised mostly of Caucasians (53.3%), but also included Hispanic/Latino (26.7%), Asian/Asian Indian (13.3%), and African American (6.7%) participants. Caucasians (56.2%) made up the majority of the AC condition, which also included Asian/Asian Indian (18.8%), Hispanic/Latino (18.8%), and Biracial (6.3%) participants. There were co-morbid diagnoses within both conditions. Specifically, 33.3% of the AT condition and 18.8% of the AC condition met criteria for a secondary diagnosis, although this difference was not statistically significant, $\chi^2(6, 31) = 8.368$, $p = .212$, $\Phi = .520$. Co-morbid diagnoses in the AT condition included major depressive disorder (in partial remission; 6.7%), dysthymic disorder (6.7%), panic disorder without agoraphobia (6.7%), and specific phobia (13.3%). Co-morbid diagnoses in the AC condition included major depressive disorder (in either partial or full remission; 18.8%). See Table 1 for participant demographics.

Table 1
Demographics

	AT (n = 15)	AC (n = 16)
	M (*SD*)	M (*SD*)
Age	24.20 (7.99)	24.44 (6.96)
	n (%)	*n* (%)
Sex		
Male	7 (46.7)	10 (62.5)
Female	8 (53.36)	6 (37.5)
Race		
African American	1 (6.7)	0 (0.0)
Asian/Asian Indian	2 (13.3)	3 (18.8)
Caucasian	8 (53.3)	9 (56.2)
Latino/a	4 (26.7)	3 (18.8)
Biracial	0 (0.0)	1 (6.2)
Comorbid Diagnoses		
Major Depressive Disorder	1 (6.7)	3 (18.8)
Dysthymia	1 (6.7)	0 (0.0)
Specific Phobia	2 (13.3)	0 (0.0)
Panic Disorder without Agoraphobia	1 (6.7)	0 (0.0)

Note. All patients with major depressive disorder were in either partial or full remission.

Assessment

Diagnosis and Severity

Diagnostic interview. The Anxiety Disorders Interview Schedule (ADIS; Brown, Dinardo, & Barlow, 1994) was used to assess for DSM-IV-TR Axis-I diagnoses. The ADIS was administered by trained doctoral student clinicians who demonstrated both aptitude and interrater reliability in performance prior to the start of the study. Training to proficiency followed similar methods used by Schmidt and colleagues (2009; reviewing ADIS training tapes, observing taped ADIS administration, observing live ADIS administration, and conducting ADIS interviews with a trained interviewer) to facilitate an accurate replication. Diagnoses were determined during weekly clinical meetings under the direction of a licensed clinical psychologist (the second author). Twenty percent of all diagnostic interviews conducted during the study were audio-recorded and rated by a blinded clinician to establish inter-rater reliability, which was excellent

(κ =1.0).

Clinician-rated measures. The Clinical Global Impressions (CGI; Guy, 1976) Severity of Illness and Improvement Scales are rated on an 8-point Likert-type rating scale (rated 0 to 7; *not at all ill/very much improved* to *among the most extremely ill patients/very much worse*). The CGI-Severity scale reflects the severity of the patient's condition and the CGI-Improvement scale reflects the degree to which the patient improved from pre- to post- treatment, based on the perception of the clinician. Participants with scores of either two or one (*much improved* or *very much improved* respectively) on the CGI-Improvement at post-treatment were classified as treatment responders.

The Behavioral Avoidance Rating Scale (BARS; Beidel et al., 2007) is a 7-point Likert-type scale (rated 0 to 6; *no avoidance* to *complete avoidance*) developed by the second author and reflects the degree to which the patient avoids social situations. Twenty percent of all clinician-rated measures were rated by a blinded clinician to establish inter-rater reliability, which was adequate for the CGI severity (ICC = .91), CGI-Improvement (ICC = 1.00), and BARS (ICC = .79).

Social Anxiety

Clinician-rated measure. The Brief Social Phobia Scale (BSPS; Davidson et al., 1991) is an 11-item clinician-administered measure comprised of seven social situations and four physiological symptoms (i.e., blushing, palpitations, trembling, sweating) commonly experienced by individuals with SAD. Clinicians rate the patient's fear and avoidance relative to the social situations along with the severity of their physiological symptoms using a 5-point Likert-type rating scale (rated 0 to 4; *none* to *extreme*). Inter-rater reliability was adequate for the BSPS (ICC = .88).

Self-report measures. The Social Phobia and Anxiety Inventory (SPAI; Turner et al., 1989; Turner, Beidel, & Dancu, 1996) is an empirically derived self-report measure that includes 45 items rated on a 7-point Likert-type scale (rated 0 to 6; *never* to *always*) reflecting the frequency of the rater's experiences. The SPAI provides both a Social Phobia and Agoraphobia subscale, and a difference score of the two which indicates a more pure measure of SAD, and which was used as the primary outcome measure of the current investigation. The SPAI has demonstrated good psychometric properties (Beidel, Turner, et al., 1989; Bunnell, Joseph, & Beidel, 2012; Turner, Beidel, et al., 1989). The internal consistency was adequate for the SPAI (Cronbach's $\alpha = .97$) in the current sample.

The Liebowitz Social Anxiety Scale-Self Report (LSAS-SR; Liebowitz, 1987) is a 24-item self-report measure that assesses both fear (rated 0 to 3; *none* to *severe*) and avoidance (rated 0 to 3; *never* to *usually*) of social interaction and performance situations. The LSAS-SR has demonstrated good psychometric properties (Baker, Heinrichs, Kim, & Hofmann, 2002; Fresco et al., 2001) and scores are comparable to those of the clinician-rated version (Fresco et al., 2001). The internal consistency was adequate for the LSAS-SR (Cronbach's $\alpha = .89$) in the current sample.

Depression

The Beck Depression Inventory–II (BDI-II; Beck, Steer, & Brown, 1996) is a self-report measure of depressive symptoms with 21 items which are rated on Likert-type scale (rated 0 to 3). The BDI-II has demonstrated good psychometric properties (Dozois, Dobson, & Ahnberg, 1998). The internal consistency was adequate for the BDI-II (Cronbach's $\alpha = .91$) in the current sample.

Behavioral Assessment of Social Anxiety and Behavior

A behavioral assessment was used to assess social behaviors and anxiety at pre- and post-treatment. The two in-vivo social interaction tasks included an adapted Unstructured Conversation Task (UCT; Turner, Beidel, Cooley, & Woody, 1994) and an Impromptu Speech Task (IST; Beidel et al., 2010). Each participant rated their level of anxiety immediately following each task using a 9-point Likert-type rating scale (0 to 8; *no distress* to *extreme distress*). Behavioral assessments were video and audio recorded and behaviors were coded by independent raters (blinded to treatment condition and time of assessment) using the Noldus Observer XT (Version 10.1; Noldus Information Technology, 2010). Briefly, the Noldus Observer XT software allows for the coding of behaviors at various playback speeds with exact precision (in hundredths of seconds). The Observer XT provides an output with the duration and frequency of each behavior, which can then be used for statistical analyses and comparisons.

UCT. The UCT involved a 5-minute social interaction during which participants were given one of two scenarios, which was randomly selected at pre-treatment. The unused scenario was given during the post-treatment UCT. The two scenarios were a) moving into a new house and meeting a new neighbor and b) meeting someone at a dinner party. Participants were instructed to "get to know [the confederate] by having a conversation with him/her". In these unstructured tasks, confederates were trained to respond to the participant in a pleasantly neutral manner without leading the conversation, and the sex of the confederate was randomized for each assessment. Social behaviors were coded using the Noldus Observer XT as the total duration (in seconds) of each participant's eye/facial gaze and time spent speaking during the UCT. Additionally, the participants' self-reported anxiety during the task was recorded using the 9-point Likert-type scale described above.

IST. The IST required participants to prepare a 10-minute speech and deliver it to an audience of five confederates. Participants were given three minutes to prepare the speech using a maximum of three out of five topics provided by the experimenter. Participants were allowed to terminate the speech after three minutes by holding up a "stop card", if the distress from speaking became too great. Social behaviors were coded, using the Noldus Observer XT, as the total duration (in seconds) of each participant's time spent speaking, eye/facial gaze, and time before requesting to end the task during the IST. Escape behavior (i.e., requesting to end the task early) was also coded. Additionally, the participants' self-reported anxiety during the task was recorded using the 9-point Likert-type scale described above.

Treatment Credibility

Three questions regarding treatment credibility (adapted from Borkovec & Nau, 1972) were administered following the second treatment session. These measures assessed confidence in treatment, perception of logicalness of treatment, and confidence in recommending the treatment to a friend. Responses were rated on a 3-point Likert-type scale (0 to 3; n*ot at all* to v*ery much*).

Treatment

Materials. Faces used for the treatment program were selected from a standardized set of emotional expressions (Matsumoto & Ekman, 1989). The set includes pictures of faces of eight individuals (four men and four women) displaying neutral and negative/threatening (i.e., disgust) expressions. Pictures were centered horizontally 17.5 cm from the left edge of the screen and 3.0 cm from the top of the screen, and there was a 1.5 cm gap between the bottom of the top image and the top of the bottom image. Pictures were presented against a static light grey background via LCD computer monitor. Trials were conducted using E-Prime Professional 2.0 (Psychology

Software Tools, Inc., Sharpsburg, PA). An independent research assistant created desktop links to each condition that were masked by ambiguous names (e.g., “Skinner” or “Jung”) to blind clinicians and participants to treatment condition. These ambiguous names were entered next to the participants’ names on a tracking sheet to ensure that their assigned treatment was administered.

Attention Training. The attention training protocol mirrored that conducted by Amir et al. (2009) and Schmidt et al. (2009), who used a modified dot-probe paradigm originally designed by MacLeod et al. (1986). Each trial began with the presentation of a fixation cross (“+”) in the center of the monitor for 500ms. Two faces of the same individual were then presented (one on top and one on bottom) for 500ms. Each pair of faces displayed one of two combinations of emotions (i.e., neutral and disgust, or neutral and neutral). Following this presentation, a probe (the letter *E* or *F*) replaced one of the two faces, and participants pressed the corresponding button (right or left) on the computer mouse to identify either a probe of *E* or *F*. A new trial began following the participants’ response. During each session, participants observed a total of 160 trials, 128 (80%) of which included the presentation of the probe in place of a neutral face: 2 (disgust face position: top or bottom) × 2 (probe type: *E* or *F*) × 8 (person) × 4 (repetition). The remaining 32 (20%) trials included only neutral faces: 2 (probe type: *E* or *F*) × 2 (probe position: top or bottom) × 8 (person).

Attention Control. The AC condition replicated the AT condition with the exception of the frequency in which the probe appeared in the place of neutral expressions rather than those of disgust. A total of 160 trials were conducted and included 64 trials (40%; neutral-disgust) where the probe replaced the disgust face, 64 trials (40%; neutral-disgust) where the probe replaced the neutral face, and 32 trials (20%) where only neutral faces were presented.

RESULTS

Statistical Analyses

Preliminary analyses indicated that participants in the two treatment conditions did not differ significantly on any outcome measure at pre-treatment. Post-treatment data were complete for all participants with the exception of behavioral data for one participant in the AT condition who completed all treatment sessions and post-treatment assessment measures but refused to participate in the behavioral assessment at post-treatment (See Figure 1). The intention-to-treat approach was used for this participant when analyzing post-treatment behavioral assessment data. Analysis of covariance (ANCOVA) was used to compare post-treatment scores while co-varying for pre-treatment scores, as recommended by Van Bruekelen (2006). Chi square and analysis of variance (ANOVA) were used to examine differences between groups for variables which were categorical (i.e., treatment responder status, escape during the speech task) or had no pre-treatment scores (i.e., CGI-Improvement scores, treatment credibility). Means, standard deviations, and between-group effect sizes for outcome variables are displayed in Table 2.

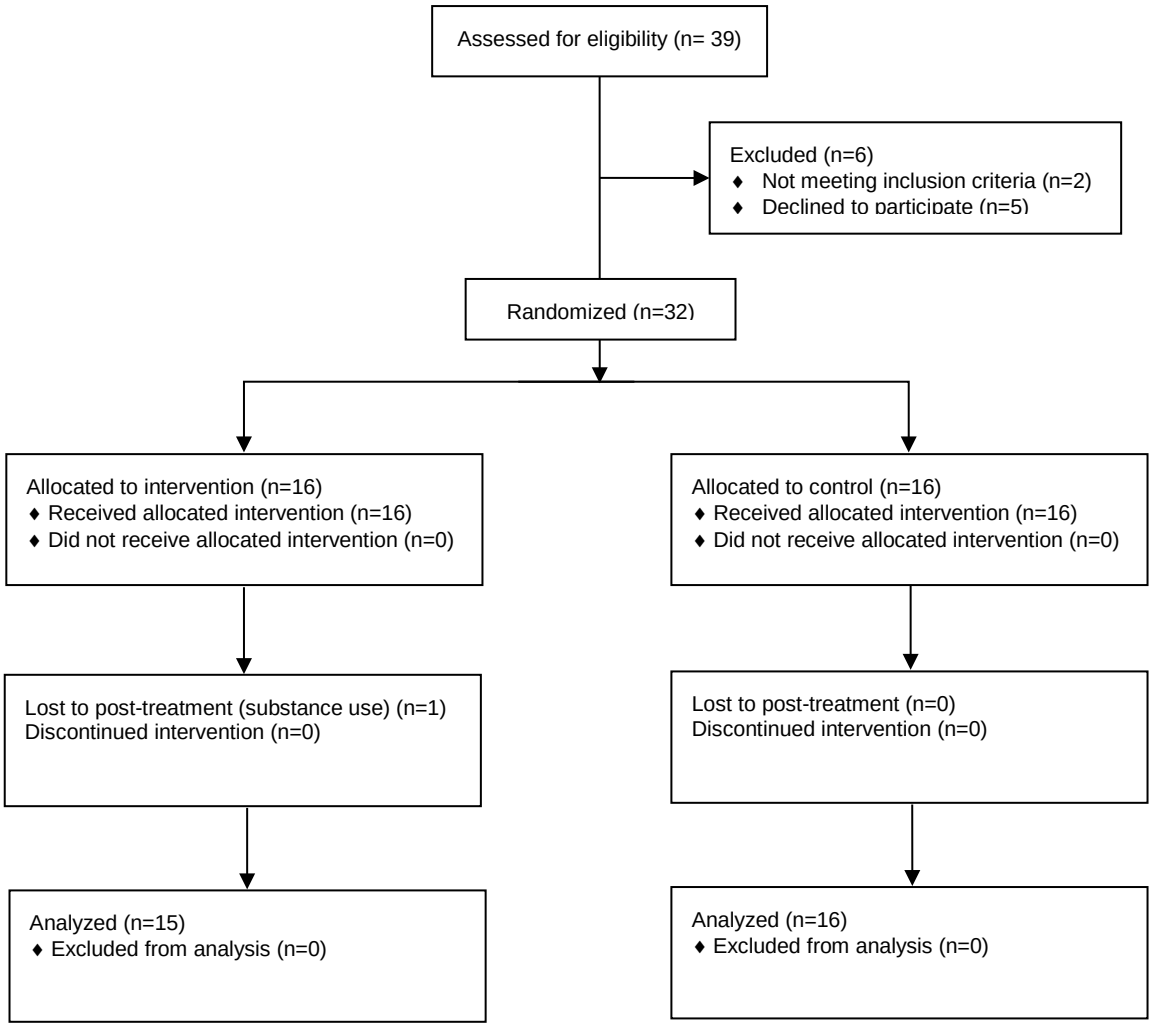

Figure 1
Consort Diagram

Diagnosis and Severity at Post-Treatment

All participants met DSM-IV-TR diagnostic criteria for SAD at post-treatment. Scores on the CGI-Improvement scale were not significantly different between the two conditions, $F(1,29) = .151$, $p = .701$, $\eta p2 = .005$. One participant in the AT condition (6.7%) was classified as a treatment responder (i.e., received a score of 1 or 2 on the CGI-Improvement scale) whereas no participants in the AC condition were classified as a responder, a difference that was not statistically significant, $\chi^2(1, 31) = 1.102$, $p = .294$, $\Phi = .189$**.** Consistently, participants in the

two treatment conditions did not differ significantly at post-treatment on CGI-Severity scores, $F(1,28) = .315$, $p = .579$, $\eta_p^2 = .011$, or BARS ratings, $F(1,28) = .127$, $p = .724$, $\eta_p^2 = .005$.

Social Anxiety

Clinician-rated measure. Participants in the two treatment conditions did not differ significantly at post-treatment on BSPS scores, F(1,28) = .034, p = .856, ηp2 = .001.

Self-report measures. Participants in the two treatment conditions did not differ significantly at post-treatment on SPAI, $F(1,28) = .748$, $p = .394$, $\eta_p^2 = .026$, or LSAS-SR scores, $F(1,28) = 2.343$, $p = .138$, $\eta_p^2 = .080$.

Depression

Participants in the two treatment conditions did not differ significantly at post-treatment on BDI-II scores, F(1,28) = .654, p = .426, ηp2 = .023.

Behavioral Assessment of Anxiety and Social Behavior

Anxiety level during social interactions. Participants in the two treatment conditions did not differ significantly at post-treatment on **s**elf-reported anxiety during the UCT, $F(1,28) = .315$, $p = .579$, $\eta_p^2 = .011$, or the IST, $F(1,28) = .058$, $p = .812$, $\eta_p^2 = .002$.

Social behaviors during social interactions. For the *UCT*, there were no significant differences between treatment conditions on the percent of time making eye/facial gaze during the task, $F(1,28) = 3.452$, $p = .074$, $\eta_p^2 = .110$. The two conditions did differ significantly on the duration of time speaking during the task. Participants in the AT condition spoke significantly longer (55.25% of time in the task) than those in the AC condition (51.90%; $d = .20$), $F(1,28) = 4.454$, $p = .044$, $\eta_p^2 = .137$.

For the *IST*, participants in the two treatment conditions did not differ significantly at post-treatment on the percent of time making eye/facial gaze during the task, $F(1,28) = 1.348$, p

= .255, η_p^2 = .046. The two conditions did differ significantly on the duration of time speaking during the task. Participants in the AC condition spoke significantly longer (89.33% of the time in the task) than those in the AT condition (84.82%, *d* = .28), *F*(1,28) = 4.395, *p* = .045, η_p^2 = .136. Some participants did not speak at all but stood silently before ending the task. Escape was defined as the number of participants who requested to end the IST early due to overwhelming anxiety. Results of the chi square test revealed no group difference in the number of participants who escaped the IST (86.7% versus 100% for the AT and AC conditions, respectively; χ^2[1, 31] = 2.280, *p* = .131, Φ = .271). The groups also did not differ significantly on the length of time they remained in the task prior to escape, *F*(1,28) = 1.012, *p* = .323, η_p^2 = .035.

Treatment Credibility

Participants in the two treatment conditions did not differ significantly on how confident they were in treatment, F(1,27) = .063, p = .804, ηp2 = .002, how logical the treatment seemed to them, F(1,27) = .127, p = .847, ηp2 = .064, or how confident they would be in recommending the treatment to a friend, F(1,27) = .441, p = .512, ηp2 = .016.

Table 2
Means and standard deviations of study outcome variables at pre- and post-treatment

	Pre		Post		
	AT	AC	AT	AC	
	M (*SD*)	M (*SD*)	M (*SD*)	M (*SD*)	*d*
Severity					
CGI-S	5.20 (.86)	5.19 (.75)	4.67 (.90)	4.81 (.54)	.19
CGI-I	-	-	3.67 (.72)	3.75 (.44)	.13
BARS	4.27 (.80)	4.13 (.80)	3.87 (.99)	3.88 (.95)	.01
Social Anxiety					
BSPS	48.73 (8.59)	48.43 (8.51)	43.66 (9.31)	42.93 (11.18)	.07
SPAI	106.80 (15.48)	111.24 (23.75)	86.36 (28.88)	95.81 (19.38)	.38
LSAS-SR	86.66 (18.25)	76.80 (22.21)	59.93 (20.01)	66.37 (22.67)	.30
Depression					
BDI-II	16.00 (10.88)	15.31 (11.06)	11.93 (10.84)	14.06 (11.33)	.19
Behavioral Assessment					
UCT					
Anxiety	5.40 (1.59)	5.43 (2.06)	3.20 (2.24)	3.56 (1.36)	.19
Eye-gaze (%)	45.22 (18.21)	49.27 (17.83)	52.32 (19.10)	57.61 (22.03)	.25
Speaking (%)	38.93 (17.01)	45.15 (14.33)	55.25 (16.15)	51.90 (16.94)	.20
IST					
Anxiety	6.73 (2.01)	6.56 (1.75)	5.20 (2.21)	4.93 (1.95)	.13
Eye-gaze (%)	36.37 (24.83)	40.28 (22.96)	32.60 (20.28)	42.96 (29.74)	.40
Speaking (%)	80.51 (19.73)	73.05 (22.64)	84.82 (16.54)	89.33 (14.97)	.28
Before escape(s)	272.01 (161.92)	236.62 (109.92)	346.47 (167.55)	278.73 (132.10)	.45
Credibility					
Confidence	-	-	.85 (.66)	.80 (.56)	.08
Logicalness	-	-	.71 (.72)	.40 (.50)	.50
Recommend	-	-	.93 (.61)	.80 (.41)	.25

Note. CGI-S = Clinical Global Impressions-Severity (Guy, 1976); CGI-I = Clinical Global Impressions-Improvement (Guy, 1976); BARS Behavioral Avoidance Rating Scale (Beidel et al., 2007); BSPS = Brief Social Phobia Scale (Davidson et al., 1991); SPAI = Social Phobia and Anxiety Inventory (Turner et al., 1989; Turner, Beidel, & Dancu, 1996); LSAS-SR = Liebowitz Social Anxiety Scale-Self Report (Liebowitz, 1987); BDI-II = Beck Depression Inventory–II (Beck, Steer, & Brown, 1996); UCT = Unstructured Conversation Task (Turner, Beidel, Cooley, Woody, & Messer, 1994); IST = Impromptu Speech Task (Beidel et al., 2010). *d* = Cohen's *d*. *d* was calculated as between group effect size at post-treatment and does not account for variation in pre-treatment scores.

DISCUSSION

This was the first study to explicitly replicate previous methodology for attention training for social anxiety (Amir et al., 2009; Schmidt et al., 2009) but also expand the assessment of patient outcome to include behavioral assessment. The results of this investigation revealed that all participants met DSM-IV-TR criteria for SAD at post-treatment despite treatment condition. Consistently, scores on the SPAI did not differ between the two conditions at post-treatment, even when accounting for pre-treatment differences. Finally, between-group differences on self-reported anxiety and blinded observer ratings of social behavior during in-vivo social interactions (i.e., the UCT and IST) were not observed. No differences were found for social skill variables such as eye/facial gaze, time before escape, or the number of participants who escaped during the IST. Only two behavioral indices indicated group differences, although the results did not favor one group over the other.

With regard to diagnosis at post-treatment, it was expected that some participants in the AT condition would no longer meet criteria for SAD given rates of recovery reported in prior investigations (i.e., Amir et al., 2009; Schmidt et al., 2009) yet this was not the case in this investigation. Although we used a different diagnostic interview, diagnoses were reliable and accurate, as reflected by high inter-rater reliability. During post-treatment diagnostic interviews, all participants reported experiencing considerable distress and avoidance in social situations, few reported noticing positive change in their condition, and all participants requested additional treatment. Furthermore, data from clinician- and self-report measures revealed no group differences on any measures (i.e., the BSPS, SPAI, and LSAS-SR). Average scores on self-report measures at post-treatment fell at or above the recommended cutoff criteria for probable SAD (approximately 60 for the LSAS-SR [Rytwinski et al., 2009] and the SPAI [Turner, Beidel &

Dancu, 1996]). Post-treatment between-group differences on these measures were smaller than those observed in the Amir et al. (2009) investigation, as reflected by between-group effect sizes at post-treatment (d = .30 to .38).

A close perusal of Table 2 reveals decreases on all measures for both treatment conditions. This is to be expected, though, considering non-specific treatment effects that might occur simply from attending therapy (e.g., the development of patient-therapist relationships; see Patterson [1985] for a review of therapist-related variables associated with non-specific treatment effects) and underscores the need for placebo control conditions in randomized controlled trials. In some instances, decreases in symptomology may shift a patient's status to the extent that he/she no longer experiences functional impairment even if occasional fears/worries remain. However, in this investigation decreases in symptom severity did not result in a loss of diagnosis for any patients, suggesting all participants were still functionally impaired.

The addition of a behavioral assessment of social anxiety and social behavior is unique to this investigation and provides an important clinical perspective on patient functioning. In particular, rather than examining solely statistically significant changes on self-report measures of patient functioning, clinically significant change in real-world functioning may be more closely examined (Kazdin, 1999). Significant differences between groups on speech duration during the two tasks were found at post-treatment, although these differences did not favor one group over the other (i.e., the AT group spoke longer during the UCT and the AC group spoke longer during the IST; see Figure 2). However, between group effect sizes at post-treatment were small (i.e., d = .20 to .28), suggesting that any gains were minimal.

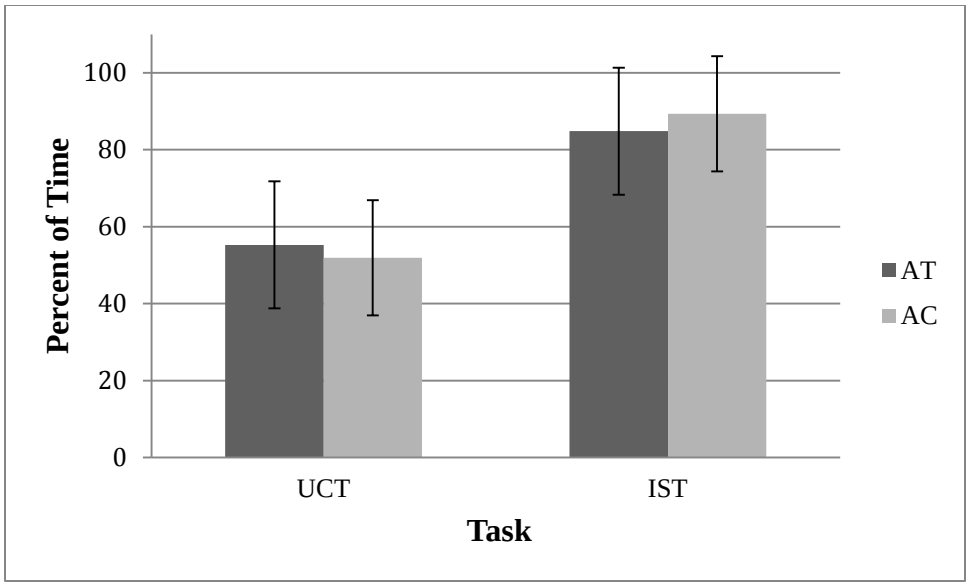

Figure 2
Percent of time speaking during the post-treatment behavioral assessment

Another unique aspect of this investigation is the assessment of participants' perception of treatment credibility. In addition to the lack of group difference, both groups endorsed low ratings with regard to their confidence in the treatment, the logicalness of the treatment, and the likelihood that they would recommend the treatment to a friend. This low confidence, of course, could be related to the lack of treatment outcome, although the similarly low levels of confidence reported by both groups suggests that confidence did not relate to the lack of differential between-group effects for the treatment.

Implications

The results of the current investigation do not support the efficacy of attention training for the treatment of SAD and are consistent with other recent investigations finding negative effects for modified versions of this treatment (Boettcher et al., 2011; Carlbring et al., 2012; Heeren et al., 2012; Neubauer et al., 2012). Consistent with Emmelkamp (2012)'s statement that "there is no robust evidence that attention training is of clinical value," the results of this study provide further support for this claim. Why the positive response of the initial investigations has

not withstood the test of replication is unclear but merits further research. Given the significant prevalence of this disorder, establishing the efficacy of a range of interventions remains an important goal of clinical research. Furthermore, efficacious interventions that may be administered by sub-doctoral level clinicians are necessary. At this time, there are questions regarding the ability of attentional training therapies to deliver their initial promise.

Limitations

There are several limitations of this investigation. First, the limited sample size raises concerns regarding the adequacy of power to detect significant differences across groups. However, an a priori power analysis using power of .80 and a medium effect size indicated that the current sample would be acceptable for the planned analyses. Furthermore the current study's sample size (n = 31) exceeded that of others (e.g., Schmidt et al., 2009) at follow-up (n = 26), the only time-point at which significant differences between groups were observed. Second, the demographics of the current sample appear to differ somewhat from those of Amir et al. (2009). Particularly, the average age of the current sample was somewhat younger and slightly more diverse with respect to race/ethnicity. It is possible that these differences may have affected the credibility of computer-based intervention modalities and hence their effectiveness, although the interplay of these factors has yet to be studied for this intervention. Third, the generalizability of this study's behavioral assessment as an analogue for day-to-day social interactions may appear limited. However, decades of research affirm the ability of these tasks to approximate in-vivo interactions and in this study the tasks elicited a significant level of anxiety in the participants. Clearly, behavioral assessment is an important tool in understanding functional impairment relative to various psychopathologies, particularly SAD.

Conclusion

This study was an attempt to replicate previous investigations of attention training as a treatment for adult SAD (i.e., Amir et al., 2009; Schmidt et al., 2009) using a multimodal assessment of patient functioning. Consistent with other studies investigating modified versions of this protocol, we were unable to replicate the positive results of these initial investigations based on either patient- or clinician-report, as well as behavioral assessment of social functioning. Future investigations should seek to further elucidate the exact mechanisms by which these treatments may affect levels of social anxiety in patients with SAD.

APPENDIX A: IRB APPROVAL LETTER

University of Central Florida Institutional Review Board
Office of Research & Commercialization
12201 Research Parkway, Suite 501
Orlando, Florida 32826-3246
Telephone: 407-823-2901 or 407-882-2276
www.research.ucf.edu/compliance/irb.html

Approval of Human Research

From: **UCF Institutional Review Board #1**
FWA00000351, IRB00001138

To: **Brian E. Bunnell** and Co-PI: **Deborah Casamassa Beidel**

Date: **June 15, 2012**

Dear Researcher:

On 6/15/2012, the IRB approved the following human participant research until 6/14/2013 inclusive:

Type of Review:	IRB Continuing Review Application Form
Project Title:	Computerized Treatment for Generalized Social Phobia
Investigator:	Brian E Bunnell
IRB Number:	SBE-11-07729
Funding Agency:	
Grant Title:	
Research ID:	N/A

The Continuing Review Application must be submitted 30days prior to the expiration date for studies that were previously expedited, and 60 days prior to the expiration date for research that was previously reviewed at a convened meeting. Do not make changes to the study (i.e., protocol, methodology, consent form, personnel, site, etc.) before obtaining IRB approval. A Modification Form **cannot** be used to extend the approval period of a study. All forms may be completed and submitted online at https://iris.research.ucf.edu .

If continuing review approval is not granted before the expiration date of 6/14/2013, approval of this research expires on that date. When you have completed your research, please submit a Study Closure request in iRIS so that IRB records will be accurate.

Use of the approved, stamped consent document(s) is required. The new form supersedes all previous versions, which are now invalid for further use. Only approved investigators (or other approved key study personnel) may solicit consent for research participation. Participants or their representatives must receive a copy of the consent form(s).

In the conduct of this research, you are responsible to follow the requirements of the Investigator Manual.

On behalf of Sophia Dziegielewski, Ph.D., L.C.S.W., UCF IRB Chair, this letter is signed by:

Signature applied by Joanne Muratori on 06/15/2012 10:35:03 AM EDT

IRB Coordinator

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